VIA $\begin{bmatrix} A \\ B \end{bmatrix} = (M^T M)^{-1} M^T \vec{y}$ WHERE $M = \begin{bmatrix} 1 & x_1 \\ 1 & x_2 \\ \vdots & \vdots \\ 1 & x_N \end{bmatrix}$

ALTERNATIVELY $B = \dfrac{\vec{x}\cdot\vec{y} - N M_x M_y}{\vec{x}\cdot\vec{x} - N M_x^2}$ AND $A = M_y - B M_x$.

THE CORRELATION COEFFICIENT $R = B\left(\dfrac{SD_x}{SD_y}\right)$. IT CAN BE SHOWN THAT $-1 \le R \le 1$. R MEASURES THE STRENGTH OF THE LINEAR ASSOCIATION BETWEEN $\vec{x}$ AND $\vec{y}$.

IF ONE SINGLES OUT THE PAIRS (x, Y) FOR WHICH x IS ABOUT k STANDARD DEVIATIONS ABOVE M_x, THE CORRESPONDING Y COORDINATES WILL BE ON AVERAGE ABOUT $R \cdot k$ STANDARD DEVIATIONS ABOVE M_y.

<u>HW</u> FIND A SET OF 8 TO 10 OBJECTS AND MEASURE TWO DISTINCT QUANTITIES FOR EACH. NOTE: USE THE SAME TWO QUANTITIES FOR EACH OBJECT. MAKE A SCATTERPLOT OF THE RESULTING (X, Y) PAIRS. CALCULATE AND PLOT THE LEAST SQUARES LINE ON THE SAME GRAPH. CALCULATE THE CORRELATION COEFFICIENT AND COMMENT ON IT. DO THE INDIVIDUAL LISTS $\vec{x}$ & $\vec{y}$ SATISFY THE RULE OF THUMB GIVEN ABOVE?